

### **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

1. (original) An imaging method comprising:  
displacing an imaging device in one dimension while acquiring an image of an object,  
thereby blurring the image; and  
deconvolving the blurred image to generate a multidimensional representation of the  
object.
2. (original) An imaging method comprising:  
varying the focus of an imaging device while acquiring an image of an object, thereby  
blurring the image; and  
deconvolving the blurred image to generate a representation of the object.
3. (original) The method of claim 2, the representation comprising a two dimensional projection  
image of three dimensions of the object.
4. (original) The method of claim 2, the imaging device comprising a fluorescence imaging  
device.
5. (original) The method of claim 2, varying the focus occurring while a shutter of the imaging  
device is open.
6. (original) The method of claim 2, varying the focus comprising varying an input voltage to a  
piezoelectric focusing mechanism of the imaging device.
7. (currently amended) An imaging method comprising:  
varying the focus of an imaging device while acquiring an image of an object, thereby  
blurring the image; and

deconvolving the blurred image to generate a representation of the object. The method of claim 2, varying the focus comprising applying signals to a piezoelectric focusing mechanism of the imaging device to generate oscillatory movement of the focusing mechanism.

8. (currently amended) An imaging method comprising:

varying the focus of an imaging device while acquiring an image of an object, thereby blurring the image; and

deconvolving the blurred image to generate a representation of the object, and The method of claim 2, varying the focus comprising launching a velocity-controlled focus change using the a stand-based focusing mechanism.

9. (original) The method of claim 2, acquiring the image being accomplished in two or more stages.

10. (original) An imaging method comprising:

- (a) collecting an acquired image of an object using an imaging device;
- (b) varying the focus of the imaging device while collecting the acquired image, thereby blurring the acquired image;
- (c) determining a point spread function (PSF) associated with the imaging device;
- (d) determining an optical transfer function (OTF) using the PSF;
- (e) determining an object estimate;
- (f) convolving the object estimate with the PSF, using the OTF, to generate an estimated image;
- (g) comparing the estimated image with the acquired image to obtain a ratio;
- (h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio;
- (i) multiplying the object estimate with the convolved ratio to form an updated object estimate; and

- (j) repeating steps (f) through (i) one or more times to generate a two dimensional projection image of three dimensions of the object from the updated object estimate.

11. (original) The method of claim 10, the imaging device comprising a fluorescence imaging device.

12. (original) The method of claim 10, the imaging device comprising a photosensitive camera chip.

13. (original) The method of claim 10, collecting the acquired image comprising stopping a continual clearing of the imaging device.

14. (currently amended) An imaging method comprising:

- (a) collecting an acquired image of an object using an imaging device;
- (b) varying the focus of the imaging device while collecting the acquired image, thereby blurring the acquired image;
- (c) determining a point spread function (PSF) associated with the imaging device;
- (d) determining an optical transfer function (OTF) using the PSF;
- (e) determining an object estimate;
- (f) convolving the object estimate with the PSF, using the OTF, to generate an estimated image;
- (g) comparing the estimated image with the acquired image to obtain a ratio;
- (h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio;
- (i) multiplying the object estimate with the convolved ratio to form an updated object estimate; and
- (j) repeating steps (f) through (i) one or more times to generate a two dimensional projection image of three dimensions of the object from the updated object estimate, and ~~The method of claim 10,~~ collecting the acquired image comprising opening a shutter of the imaging device.

15. (original) The method of claim 14, varying the focus occurring while a shutter of the imaging device is open.

16. (currently amended) An imaging method comprising:

- (a) collecting an acquired image of an object using an imaging device;
- (b) varying the focus of the imaging device while collecting the acquired image, thereby blurring the acquired image;
- (c) determining a point spread function (PSF) associated with the imaging device;
- (d) determining an optical transfer function (OTF) using the PSF;
- (e) determining an object estimate;
- (f) convolving the object estimate with the PSF, using the OTF, to generate an estimated image;
- (g) comparing the estimated image with the acquired image to obtain a ratio;
- (h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio;
- (i) multiplying the object estimate with the convolved ratio to form an updated object estimate; and
- (j) repeating steps (f) through (i) one or more times to generate a two dimensional projection image of three dimensions of the object from the updated object estimate, and~~The method of claim 10,~~ varying the focus comprising varying an input voltage to a piezoelectric focusing mechanism of the imaging device.

17. (currently amended) An imaging method comprising:

- (a) collecting an acquired image of an object using an imaging device;
- (b) varying the focus of the imaging device while collecting the acquired image, thereby blurring the acquired image;
- (c) determining a point spread function (PSF) associated with the imaging device;
- (d) determining an optical transfer function (OTF) using the PSF;
- (e) determining an object estimate;

- (f) convolving the object estimate with the PSF, using the OTF, to generate an estimated image;
- (g) comparing the estimated image with the acquired image to obtain a ratio;
- (h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio;
- (i) multiplying the object estimate with the convolved ratio to form an updated object estimate; and
- (j) repeating steps (f) through (i) one or more times to generate a two dimensional projection image of three dimensions of the object from the updated object estimate, and The method of claim 10, varying the focus comprising applying signals to a piezoelectric focusing mechanism of the imaging device to generate oscillatory movement of the focusing mechanism.

18. (currently amended) An imaging method comprising:

- (a) collecting an acquired image of an object using an imaging device;
- (b) varying the focus of the imaging device while collecting the acquired image, thereby blurring the acquired image;
- (c) determining a point spread function (PSF) associated with the imaging device;
- (d) determining an optical transfer function (OTF) using the PSF;
- (e) determining an object estimate;
- (f) convolving the object estimate with the PSF, using the OTF, to generate an estimated image;
- (g) comparing the estimated image with the acquired image to obtain a ratio;
- (h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio;
- (i) multiplying the object estimate with the convolved ratio to form an updated object estimate; and
- (j) repeating steps (f) through (i) one or more times to generate a two dimensional projection image of three dimensions of the object from the updated object estimate, and The method of claim 10, varying the focus comprising launching a velocity-controlled focus change using the a stand-based focusing mechanism.

19. (currently amended) An imaging method comprising:

- (a) collecting an acquired image of an object using an imaging device;
- (b) varying the focus of the imaging device while collecting the acquired image, thereby blurring the acquired image;
- (c) determining a point spread function (PSF) associated with the imaging device;
- (d) determining an optical transfer function (OTF) using the PSF;
- (e) determining an object estimate;
- (f) convolving the object estimate with the PSF, using the OTF, to generate an estimated image;
- (g) comparing the estimated image with the acquired image to obtain a ratio;
- (h) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio;
- (i) multiplying the object estimate with the convolved ratio to form an updated object estimate; and
- (j) repeating steps (f) through (i) one or more times to generate a two dimensional projection image of three dimensions of the object from the updated object estimate, and ~~The method of claim 10,~~ acquiring the image being accomplished in two or more stages.

20. (original) An imaging system, comprising:

an imaging device configured to vary its focus while acquiring an image of an object; and  
a processor in operative relation with the imaging device and configured to execute machine-readable instructions for deconvolving a resulting blurred image to generate a representation of the object.

21. (original) The system of claim 20, the representation comprising a two dimensional projection image of three dimensions of the object.

22. (original) The system of claim 20, the imaging device comprising a fluorescence imaging device.

23. (original) The system of claim 20, the instructions comprising instructions for:
- (a) determining a point spread function (PSF) associated with the imaging device;
  - (b) determining an optical transfer function (OTF) using the PSF;
  - (c) determining an object estimate;
  - (d) convolving the object estimate with the PSF, using the OTF, to generate an estimated image;
  - (e) comparing the estimated image with the acquired image to obtain a ratio;
  - (f) convolving the ratio with a mirror image of the PSF, using a complex conjugate of the OTF, to form a convolved ratio;
  - (g) multiplying the object estimate with the convolved ratio to form an updated object estimate; and
  - (g) repeating steps (d) through (g) one or more times.
24. (original) A retrofit kit for converting an imaging system, comprising:
- means for allowing an imaging device to vary its focus while acquiring an image of an object; and
  - means for deconvolving a blurred image to generate a two dimensional projection image of three dimensions of the object.